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## The Photosystem II Light-Harvesting Protein Lhcb3 Affects the Macrostructure of Photosystem II and the Rate of State Transitions in Arabidopsis

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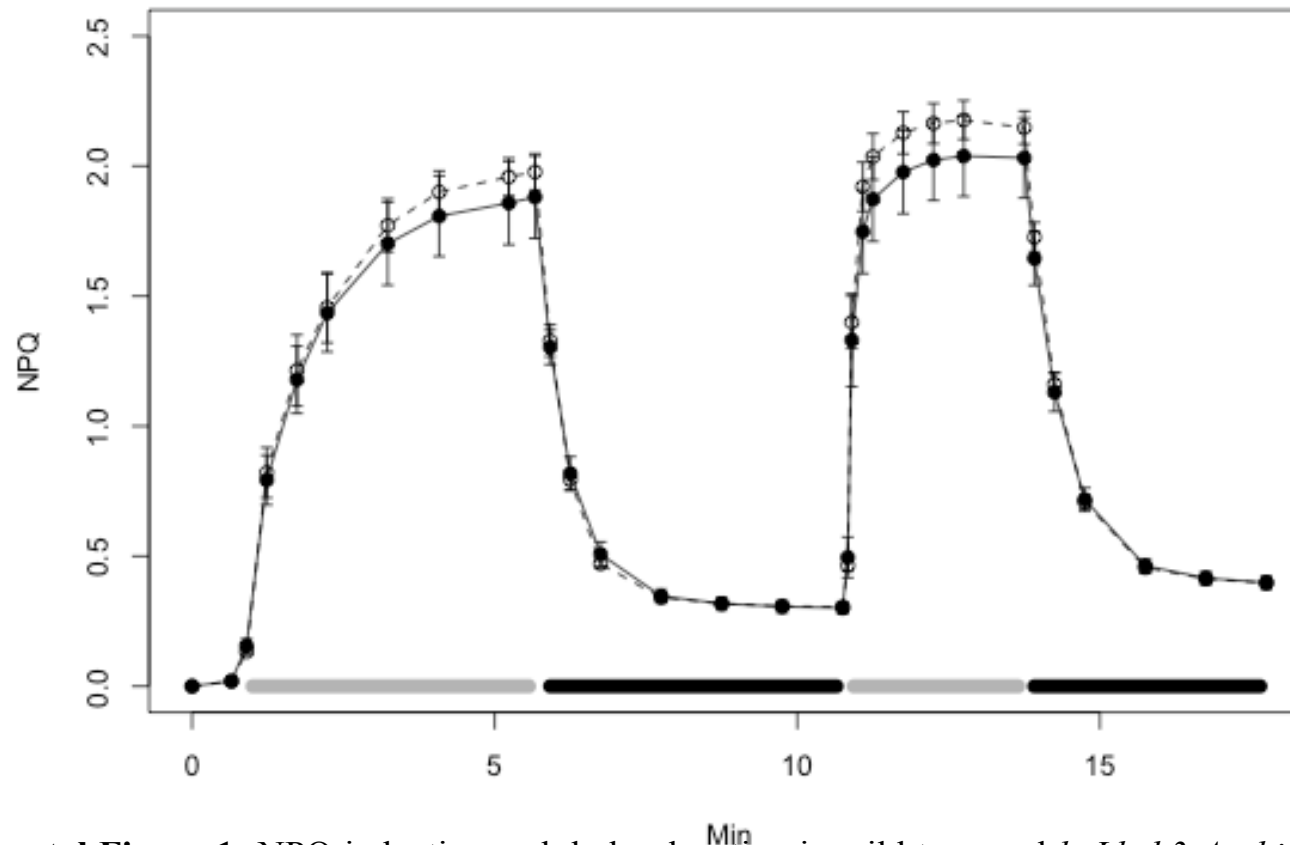
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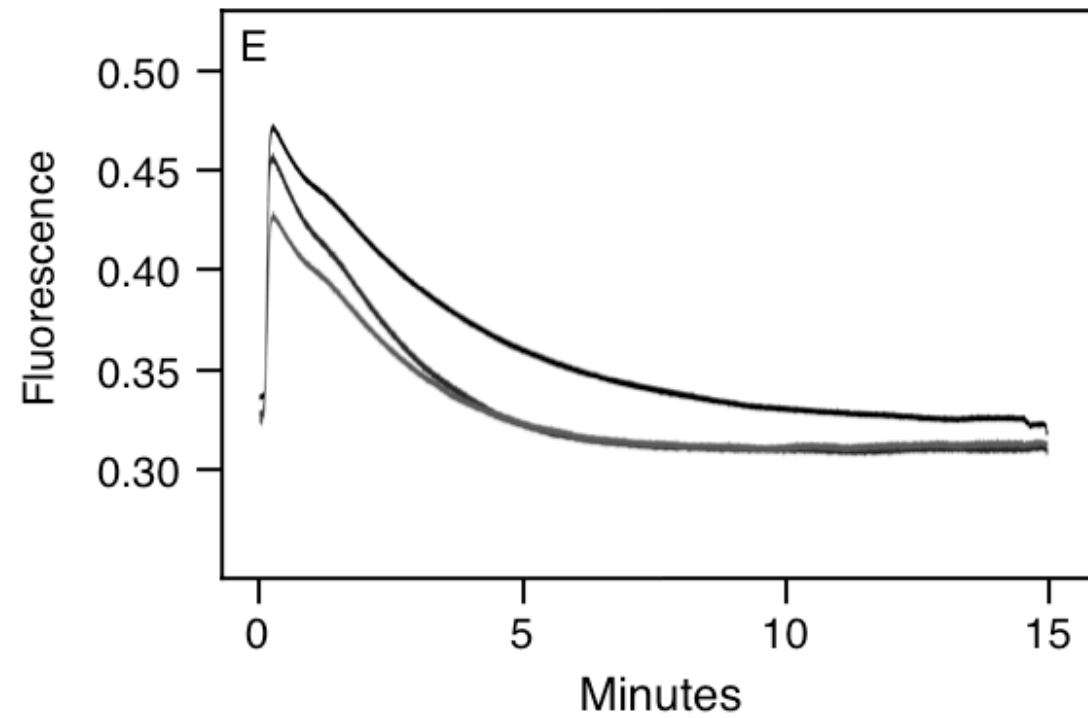
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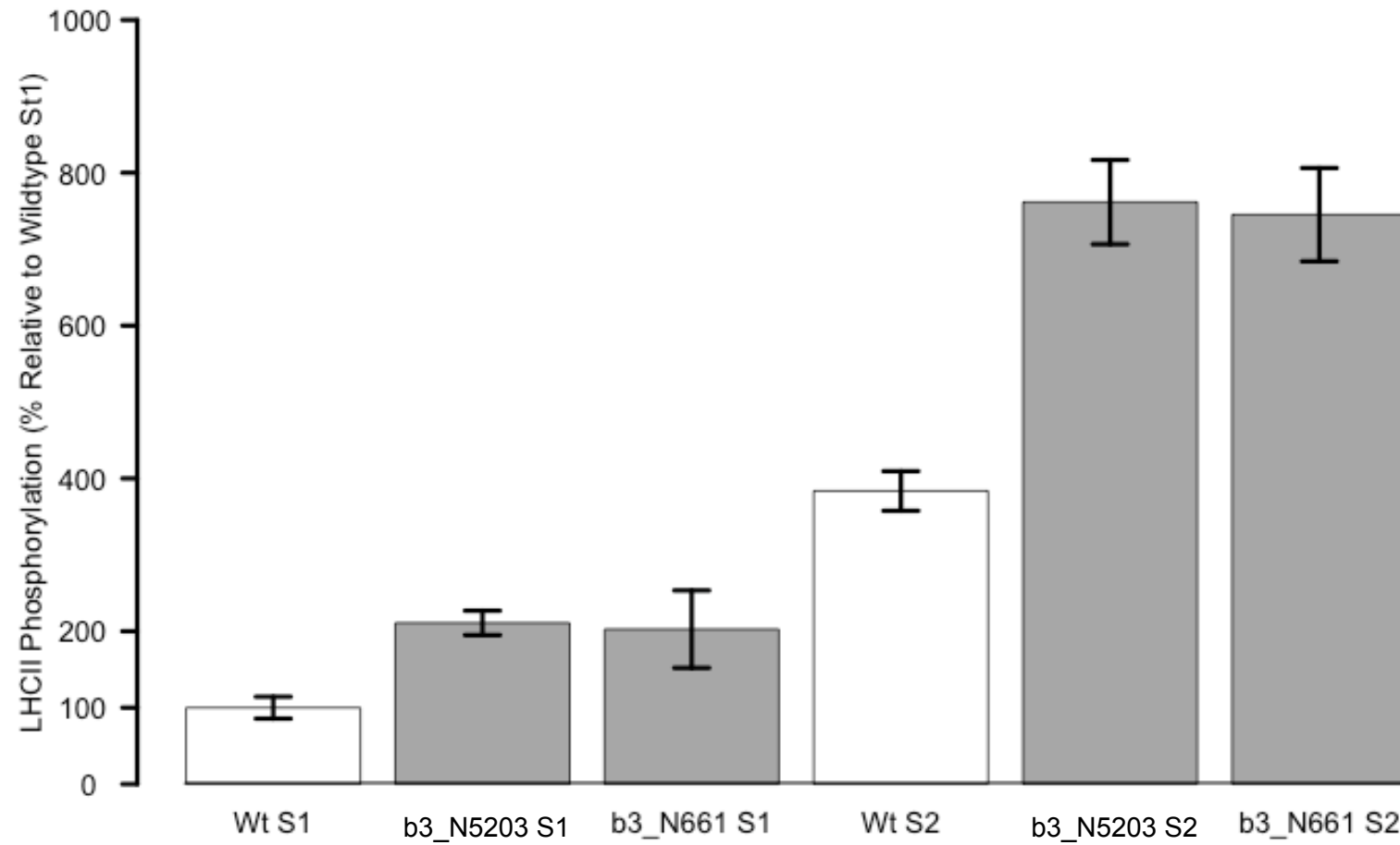
Supplemental Data Damkjær et al (2009). The Photosystem II light harvesting protein Lhcb3 affects the macrostructure of photosystem II and the rate of state transitions in *Arabidopsis*



**Supplemental Figure 1:** NPQ induction and dark relaxation in wild type and *koLhcb3* *Arabidopsis* plants. NPQ was measured at 1000 microE actinic light treatment in wild type (closed symbols, full line) and *koLhcb3* (open symbols, dashed line) *Arabidopsis* plants. Error bars show SE, n=5. The grey bars show when the actinic light is on and black bars show when actinic light is off.

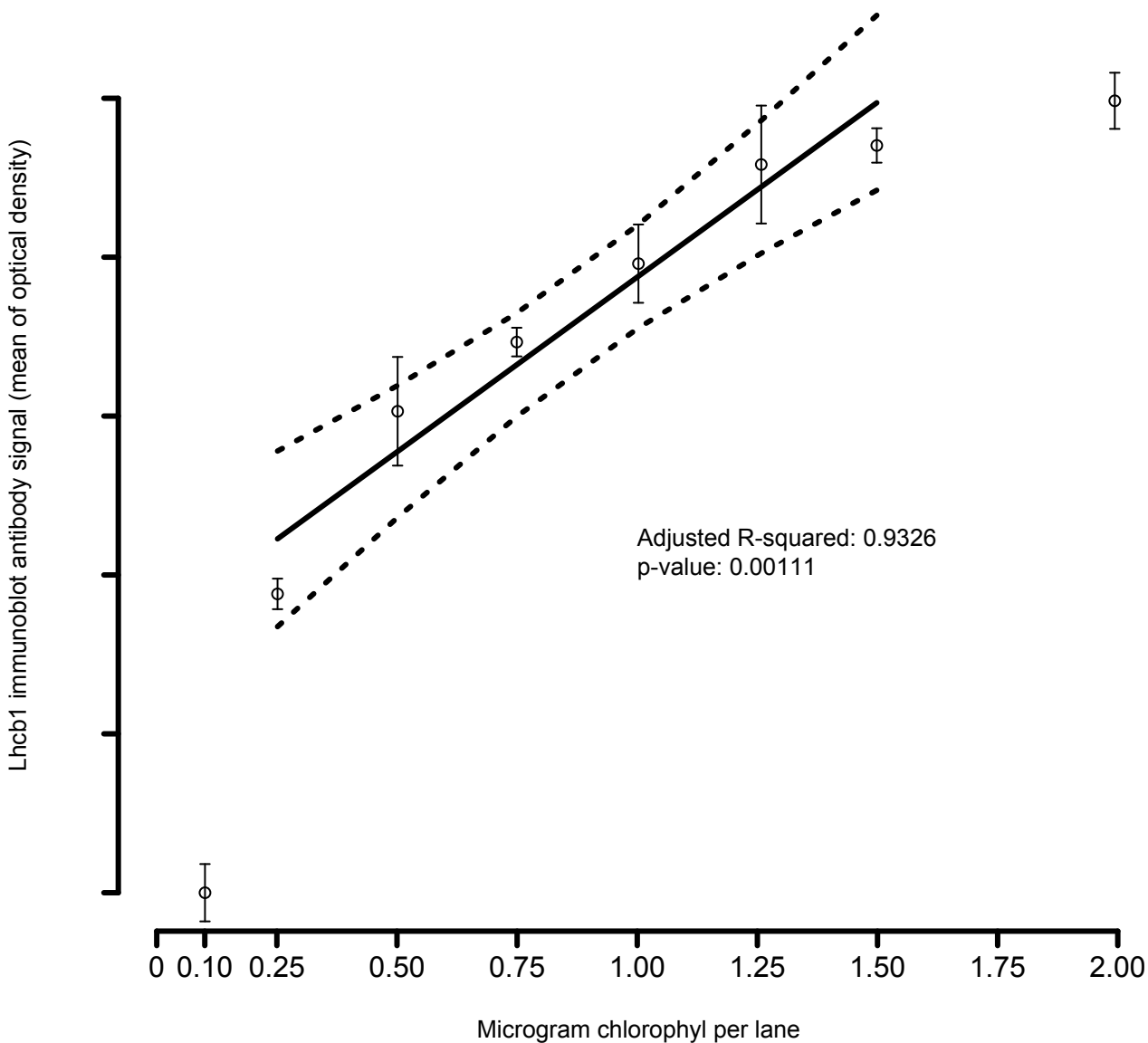


Supplemental Figure 2. State 1 to State 2 transition induced by PSII light treatment after 15 minutes PSI light (far red) illumination (n=6). The upper (black) trace shows wild type, the two lower (grey) trace shows *koLhcb3* lines N520342 and N661731.

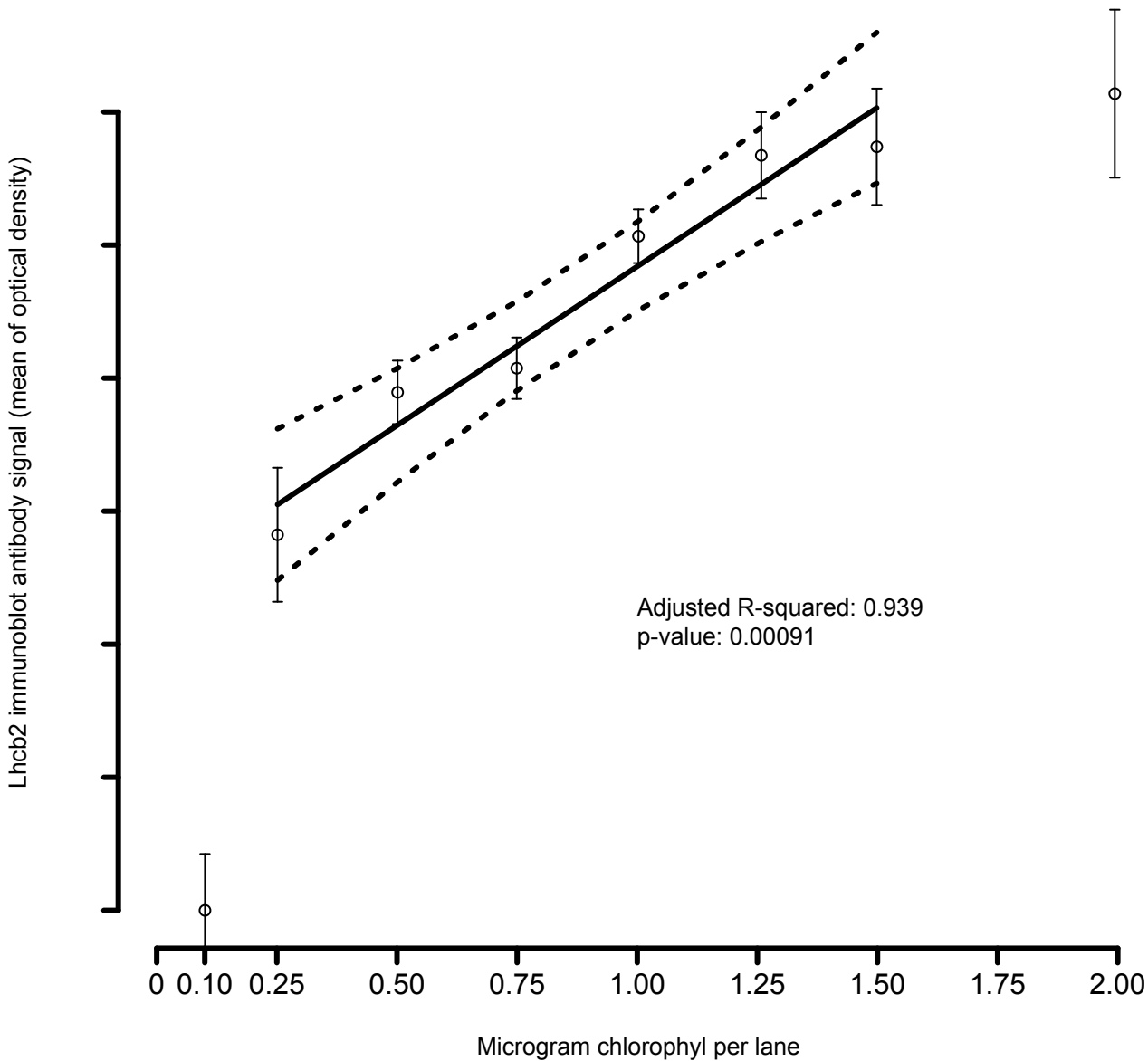


Supplemental Figure 3. In vivo LHCII phosphorylation in wild type (white bars) and koLhcb3 lines N520342 and N661731 (grey bars) *Arabidopsis* thylakoids isolated following State 1 and State 2 inducing light treatments. Results are normalised to wild type state 1 phosphorylation, corrected relative to the CP47 phosphorylation signal. Error bars show SE, n=13

Supplemental Figure 4. Linear range of the Lhcb1 antibody signal.



Supplemental Figure 5. Linear range of the Lhcb2 antibody signal.



**Supplemental Table 1:** ANOVA analysis of the significance of the interaction between genotype (Wild type or *koLhcb3*) and treatment (State 1 or State 2 light) with regard to PSII antennae size measured using maximal fluorescence and 15 minute light treatments. \*\* indicate statistically significant differences ( $p < 0.01$ ) and \*\*\* statistically significant differences ( $p < 0.001$ ) using the ANOVA test for variance, n=13.

	Df	Sum Sq	Mean Sq	F value	Pr(>F)	
<b>Genotype</b>	<b>1</b>	0.00119	<b>0.00119</b>	0.5855	<b>0.451053</b>	
<b>State</b>	<b>1</b>	0.097667	<b>0.097667</b>	48.0731	<b>2.318E-07</b>	<b>***</b>
<b>Sample date</b>	<b>3</b>	0.037241	<b>0.012414</b>	6.1102	<b>0.002741</b>	<b>**</b>
<b>Genotype:state</b>	<b>1</b>	0.001824	<b>0.001824</b>	0.8979	<b>0.352082</b>	
<b>Residuals</b>	<b>26</b>	0.052822	<b>0.002032</b>			

**Supplemental Table 2:** ANOVA analysis of the significance of the interaction between genotype (wild type or *koLhcb3*) and treatment (State 1 or State 2 light) with regard to LHCII phosphorylation. \*\* indicate statistically significant differences ( $p < 0.01$ ) and \*\*\* statistically significant differences ( $p < 0.001$ ) using the ANOVA test for variance,  $n=27$ .

	Df	Sum Sq	Mean Sq	F value	Pr(>F)	
<b>Genotype</b>	<b>1</b>	<b>4.8327E+11</b>	<b>4.8327E+11</b>	<b>46.539</b>	<b>5.572E-10</b>	<b>***</b>
<b>State</b>	<b>1</b>	2.0593E+12	<b>2.0593E+12</b>	198.3116	<b>&lt; 2.2e-16</b>	<b>***</b>
<b>Prep Date</b>	<b>1</b>	6.6701E+12	<b>6.6701E+12</b>	642.3288	<b>&lt; 2.2e-16</b>	<b>***</b>
<b>Sample Date</b>	<b>2</b>	5.1757E+11	<b>2.5878E+11</b>	24.9209	<b>1.303E-09</b>	<b>***</b>
<b>Genotype:State</b>	<b>1</b>	8.9476E+10	<b>8.9476E+10</b>	8.6165	<b>0.004078</b>	<b>**</b>
<b>Residuals</b>	<b>107</b>	1.1111E+12	<b>1.0384E+10</b>			



Supplemental Table 3. Seed set of wild type and *koLhcb3* Arabidopsis plants in the field.

	Wildtype	<i>koLhcb3</i>	t-test p-value
Mean siliques per plant	149 ± 13	152 ± 14	0.8884
Mean seeds per siliques	52.1 ± 0.9	49.3 ± 1.2	0.0623
Mean seeds per plant	7783 ± 682	7683 ± 807	0.9226